

Incommensurate Magnetic Ordering in Frustrated UNi₄B

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UNi₄B is a hexagonal intermetallic which orders antiferromagnetically at $T_N=20$ K. It has been proposed that only two thirds of the U spins overcome the geometric frustration and order, while the other one third remain paramagnetic below T_N [†]. We reinvestigated the structure with elastic neutron scattering at temperatures down to 35mK. We found that the magnetic structure is incommensurate for all $T < T_N$. While all peaks appear at T_N , there are different temperature dependences for the intensities of the three families of incommensurate magnetic peaks that were identified. The other uranium compound with the hexagonal CaCu₅-derived crystal structure which has an incommensurate magnetic structure is UNi₂Al₃. So far, all the theories on UNi₄B haven't accounted for the incommensurate magnetic structure.

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